

PRINCIPLES OF INFECTIOUS DISEASE EPIDEMIOLOGY

MODULE III – Public Health Surveillance

This outline is provided as an aid to the student. It contains only the basic content of the module. To view the supporting material such as graphics, examples, etc. please see the module itself.

I. INTRODUCTION

Module III is designed to prepare public health workers to meet the following objectives:

- Define public health surveillance and describe its components
- Demonstrate understanding of the purposes of surveillance and how it relates to public health action
- Describe the two basic forms of surveillance and the most common sources of surveillance information
- Demonstrate knowledge of how to evaluate and improve surveillance systems

II. WHAT IS PUBLIC HEALTH SURVEILLANCE?

Surveillance is the continuous monitoring of the occurrence of a disease (or other important health event) in a population. It consists of:

- Ongoing, systematic collection of health data
- Data analysis
- Interpretation of data,
- Dissemination of the information, AND
- Linking the health data to public health practice

Public Health Surveillance

- is an important part of assessment, one of the three core functions of public health.
- takes many forms, depending on the disease(s) involved and the conditions under which it is being done.
- may focus on the entire population, or on subpopulations within it.
- may be longstanding or temporary, or even intermittent.
- may be “high-tech” or very rudimentary.

Whatever form it takes, surveillance is essential to the practice of public health, especially for infectious disease prevention and control.

The concept of public health surveillance grew out of the earlier practice of **medical surveillance**, which is still done in some situations.

Medical Surveillance	Public Health Surveillance
Close observation of people exposed to a communicable disease to detect symptoms early and provide treatment or require isolation	Always looks at populations , rather than individuals

III. WHO IS RESPONSIBLE FOR PUBLIC HEALTH SURVEILLANCE?

- To be effective, surveillance systems must involve
 - public health agencies,
 - healthcare providers, and
 - the public
- Active cooperation is essential so that accurate, timely information can be collected and acted upon.
- Communication and data must flow among healthcare providers and the public, but only public health agencies can pull information together from a variety of sources, analyze it and feed it back in a form that can guide action.

IV. WHY DO WE DO PUBLIC HEALTH SURVEILLANCE?

A well-designed surveillance system can provide critical information for public health action. Agencies use various kinds of surveillance data to:

1. **Guide immediate action for cases of public health importance**, such as a rare disease or suspected bioterrorist agent
2. **Describe and monitor health events and trends through surveillance systems** in their jurisdiction
 - Who is at risk?
 - When and where is disease occurring?
 - What exposures or risk factors may be related to the disease?
 - Is there an urgent problem developing, such as an outbreak?

- Is a new disease or health concern emerging?
- 3. Set priorities for the use of resources** (time, expertise, technology and money)
 - To what activities should staff time and expertise be directed?
 - How much money should be spent on a particular problem?
 - Do we need to respond immediately to investigate and control a problem in our community?
- 4. Assist in planning, implementing and evaluating public health interventions and programs**
 - To which populations should we target interventions or control measures?
 - Are new prevention programs needed?
 - How effective are our programs and control measures in reducing disease occurrence?
- 5. Evaluate public policy**
 - Are current rules or laws protecting the public?
 - Are new rules, laws, ordinances or other policies needed?
- 6. Generate questions and hypotheses that provide direction for further research**
 - Why is this disease occurring in this specific population?
 - Is the disease the result of an environmental exposure?
 - Is this group of people especially susceptible to the disease?
 - Has the disease agent changed somehow?

Let's look at each of these uses of surveillance data in more detail.

- 1. Guiding immediate action for cases of public health importance.**
 - A good surveillance system serves as an “early warning” system for the community's health.
 - When an unusual disease case occurs, the public health agency can investigate immediately and implement control measures if needed to prevent spread.
 - For example, even a single case of anthrax, measles or diphtheria should trigger a full-scale public health investigation.
- 2. Describing and monitoring health events and trends through surveillance systems** can allow us to:
 - Detect sudden changes in disease occurrence and distribution.
 - We may notice a sudden increase that could be an outbreak.

- Or a disease that previously occurred mainly in one group of people may move to another
- Follow long-term trends and patterns of disease.
 - Many diseases ebb and flow in cycles that vary by season or over several years.
 - Knowing this may help us interpret the current situation.
- Identify changes in agents and host factors.
 - Many infectious agents change over time. (E.g., shifts in predominant salmonella serotype by year, antibiotic resistant gonorrhea].
 - Data from laboratory scientists who monitor these characteristics can be used to direct vaccine production, treatment, and other prevention and control measures.

3. Set priorities for the use of resources.

- Surveillance data are very important in determining the best use of a public health agency's time, staff and budget.
 - Which diseases or conditions have the greatest impact on the population?
- Infectious disease trends may change quickly, sometimes even overnight, and health agency resources must be flexible to respond effectively.

Example: a suspected bioterrorism incident or an outbreak of foodborne illness may supersede other routine activities. In such a situation, staff must be reassigned to:

 - intensify surveillance to identify other susceptible and potentially exposed people
 - search for the source of the problem
 - design and implement control measures (environmental controls, screening, immunization and/or treatment, restriction of activities)
- If the outbreak is large, or the disease very serious, the agency's emergency response plan may need to be activated. In that case many resources outside the agency can be brought into play.
- Surveillance data can also be used to identify when a public health problem has been solved, so that resources can be redirected to other, more pressing needs. However, if this is done too soon, the consequences can be costly. **Example:** it may be tempting to cut resources for tuberculosis

control when the incidence goes down. This was done in the 1980s, and the result was an upsurge in tuberculosis cases.

4. Assist in planning, implementing and evaluating public health interventions and programs.

Information from ongoing surveillance systems helps us identify public health problems and design programs to address them.

- In the planning stage, surveillance can pinpoint where a problem is occurring and who is affected by it so that efforts can be directed to the right area and the right people.
- In the implementation stage, good data can help persuade policymakers and community members that a program or policy change is needed and worth supporting.
- In the evaluation stage, surveillance data can help us determine the effect of our efforts. If the program or intervention is working, then disease incidence should go down.

EXAMPLES

a. When surveillance data showed that a new arbovirus, the West Nile Virus, was spreading across the country, public health agencies developed plans to prevent and control it. They tried several new approaches including:

- public education campaigns (billboards, radio spots) to promote the use of mosquito protections, including DEET insect repellent
- public education and code enforcement activities to reduce mosquito breeding sites by emptying/draining standing water
- community cleanup activities to reduce mosquito habitat

Agencies then evaluated the results of these efforts through surveys as well as by continued, intensive surveillance activities.

b. Detailed surveillance data regarding HIV infection have guided community planning for prevention programs.

- In the 1980s when AIDS first emerged, health education messages were targeted toward the groups most heavily impacted by the epidemic, men who have sex with men and injecting drug users.
- In the late 1990s, the data showed that HIV was beginning to infect more women, especially minority women.
- Outreach and education programs were designed to reach out to women, for example, by distributing gender and culture-appropriate materials in places where women go, such as beauty shops.

5. Evaluate Public Policy

Public policies, such as laws, ordinances, and institutional policies, are important public health interventions. Surveillance information can help identify needed policy changes.

EXAMPLES

- a. Immunization requirements have evolved as disease transmission patterns change.
 - School immunization rules were implemented and enforced to reduce outbreaks of measles and rubella in schools.
 - As more children entered childcare centers and homes, the transmission of vaccine-preventable diseases among preschool children increased. In the 1980s, immunization requirements for childcare attendance were developed and incorporated into licensure requirements. Outbreaks in licensed childcare settings have since become rare.
- b. Standards for food protection are codified as state rules and local ordinances. Inadequacies in these food codes were identified in the 1990s through surveillance data, and the rules were strengthened.
 - Required cooking temperatures for beef were changed because of *E. coli* O157:H7 outbreaks.
 - The rules on the transport and handling of fresh eggs were changed because of outbreaks of *Salmonella enteritidis*.

6. Generate questions and hypotheses that provide direction for further research.

- Surveillance data by themselves cannot answer questions about the causes of illness.
- However, observation of the patterns of disease can help generate ideas about causes and potential control measures.
- These ideas can be developed into research hypotheses that lead to new knowledge in disease prevention and control.

EXAMPLES

- a. Toxic shock syndrome (TSS)
 - is a serious illness caused by certain toxin-producing strains of the *Staphylococcus aureus* bacterium.
 - It usually has a sudden onset of fever, chills, vomiting, diarrhea, muscle aches and rash, and can rapidly progress to multisystem dysfunction. About 5% of cases are fatal.

- An epidemic of TSS in women of childbearing age was detected through public health surveillance in the late 1970s.
 - Menstruating women and women using barrier contraceptives such as intra-uterine devices (IUDs) were at highest risk.
 - This observation led to further research on tampons, which found that the fibers used in certain highly absorbent brands encouraged bacterial growth.
 - These brands were removed from the market, the epidemic abated, and TSS incidence has declined ever since.
- b. Vaccine policies may be adjusted as a result of research prompted by surveillance findings.
 - A puzzling upsurge in measles cases occurred in the late 1980s, in Missouri and throughout the US, mainly in school-age children.
 - This upsurge prompted CDC to study the children's antibody levels, and they found that immunity waned among those who had only had one measles shot.
 - Two doses of measles vaccine have been required for school attendance since that time.

V. CONDUCTING PUBLIC HEALTH SURVEILLANCE: THE FIVE COMPONENTS

Our definition of surveillance consists of five components:

1. Ongoing, systematic collection of health data
2. Data analysis
3. Interpretation of data,
4. Dissemination of the information, AND
5. Linking the data to public health practice

Let's look at each of these in more detail.

1. ONGOING, SYSTEMATIC COLLECTION OF HEALTH DATA→How do we get the information?

A. Legal Requirements

- Most surveillance involves the collection of personal information from medical records.

- Healthcare providers can only share such information if the proper legal framework is in place to authorize it.
- Under the federal Health Insurance Portability and Accountability Act (known as HIPAA), public health agencies have the right to collect personal health information if state law authorizes them to do so.
- This right is known as the “public health exemption” from HIPAA. Without this provision, public health surveillance would be much more difficult.
- Missouri law requires the state Department of Health and Senior Services (DHSS) to designate which diseases and conditions must be reported to public health authorities and who must report (Revised Statutes of Missouri 192.020) <http://www.moga.mo.gov/statutes/c192.htm>.
- Through the Code of State Regulations, local public health agencies are designated to receive such information as well (19 CSR 20–20.010–20.080). In the large metropolitan areas, there may also be local ordinances and rules pertaining to disease reporting.
- Some key provisions of the Missouri reporting rules include:
 - a. Mandated Reporters.** The following individuals and agencies are required to report diseases:
 - Physicians
 - Physician’s assistants
 - Nurses
 - Hospitals
 - Clinics
 - Laboratories
 - Other private or public institutions providing diagnostic testing, screening or care to any person with any reportable disease or condition
 - Persons in charge of a public or private school, summer camp or child or adult care facility
 - b. Disease Reporting Categories.** There are several categories of reportable diseases listed in 19 CSR 20–20.020, based on the urgency of reporting and response. They are:
 1. Diseases, findings, or agents that shall be reported immediately upon knowledge or suspicion by telephone, facsimile or other rapid communication.

- 1A: Selected high priority diseases, findings, or agents that occur naturally, from accidental exposure, or as the result of a bioterrorism event.
 - 1B: Instances, clusters, or outbreaks of unusual disease or manifestations of illness and clusters or instances of unexplained deaths which appear to be the result of a terrorist act or the intentional or deliberate release of biological, chemical, radiological, or physical agents, including exposures through food, water, or air.
 - 1C: Instances, clusters, or outbreaks or unusual, novel, and/or emerging diseases or findings not otherwise named in this rule, appearing to be naturally occurring, but posing a substantial risk to public health and/or social and economic stability due to their ease of dissemination or transmittal, associated mortality rates, or the need for special public health actions to control.
2. Diseases, findings, or agents that shall be reported within one (1) day of first knowledge or suspicion.
 - 2A: Diseases, findings, or agents that occur naturally, or from accidental exposure, or as a result of an undetected bioterrorism event.
 - 2B: Diseases, findings, or adverse reactions that occur as a result of inoculation to prevent smallpox.
 3. Diseases, findings, or agents that shall be reported within three (3) days of first knowledge or suspicion.
 4. Diseases or findings that shall be reported weekly.
 5. Diseases or findings that shall be reported quarterly.

The list of reportable diseases can be found at:

<http://www.dhss.mo.gov/CommunicableDisease/reportablediseaselist2.pdf>

c. Flexibility.

Missouri's rules include the provision that any unusual outbreak of disease must be reported.

- Allow healthcare providers to share information even if the specific disease or condition isn't on the official list.
- Is especially important for emerging infections, or outbreaks of unknown cause including potential bioterrorist incidents.

d. Multiple entry points for information.

Reports may be made to the local public health agency where the healthcare provider is located, or where the patient lives, or to the state DHSS.

- Provides maximum flexibility for those reporting disease, in the hope of minimizing missed cases.
 - It means, however, that communication across health agency jurisdictions is critical.
- **The entire text of 19 CSR 20-20.020 may be viewed at:**
<http://www.sos.mo.gov/adrules/csr/current/19csr/19c20-20.pdf>
- **The mandated reporting rule** has evolved over time and will continue to do so.
 - New categories of reporters may be added as the healthcare system changes.
 - New diseases may be added as they emerge into public health importance, and old ones may be removed if they are no longer significant threats.
 - Sometimes old diseases take on new significance, as happened when smallpox was added back to the list because of its potential use as a bioterrorist agent.
- **There are no penalties** if a healthcare worker fails to comply with his/her obligations under the disease reporting rules. For this reason, achievement of voluntary compliance is very important. Constant efforts are needed to educate healthcare providers about surveillance in order to keep the information flowing.
- **National Notifiable Diseases Surveillance System.** The Centers for Disease Control and Prevention (CDC) designate nationally notifiable diseases, which can be viewed at:
www.cdc.gov/eпо/dphsi/phs/infdis.htm#public. All of these diseases are included on Missouri's list. DHSS passes on reports of nationally notifiable diseases (with no personal identifying information) to the national system.

B. Sources Of Surveillance Data For Infectious Diseases

There are many sources of data for surveillance purposes. Some of the main ones are:

- Morbidity reports (mandated disease reports, laboratory test results, hospital and clinic data)

- Mortality reports (death certificates, medical examiner data)
- Surveillance systems for disease indicators (for example, animal rabies test results, bird and horse West Nile Virus test results)
- Environmental data (laboratory test results on water, milk, and food supplies)
- Student and employee data (for example, school or work absenteeism)
- Drug and biologic utilization (for example, prescriptions and sales figures on over-the-counter medications)
- Population-based surveys (for example, Behavioral Risk Factor Surveillance System, National Health and Nutrition Examination Survey)

C. Forms Of Surveillance

There are two forms of surveillance, passive and active.

1. Passive surveillance.

- Reports are initiated by the information source, such as a physician, laboratory, or hospital.
- Traditional mandated disease reporting is based on this approach.
- The public health agencies put a system in place and then wait for reports to come in by telephone, fax or mail.
 - The standard form for reporting in Missouri is the CD-1 Form. Click here to view the form: <http://www.dhss.mo.gov/CommunicableDisease/index.html>
- Passive reporting is the backbone of surveillance for many diseases, because it is easy and inexpensive for the public health agency.
- However, it can be cumbersome for the reporters, and opportunities to report are often missed.
- Systems that depend solely on passive reporting usually undercount disease incidence.

2. Active surveillance.

- The public health agency initiates contact with the reporting sources on a regular basis (daily, weekly, etc.).
- Contacts may be made by telephone, electronically, or through on-site record review by public health agency staff.
- With active surveillance, reports are solicited even if they indicate zero disease activity for that time period.

- Active surveillance often takes the form of sentinel surveillance. This can involve regular contact with a selected set of sentinel sites or providers, or using animals or insect vectors as “sentinels” for a particular disease.
- Electronic medical records systems have opened up many new possibilities for active surveillance.

Example: DHSS is developing a process that will allow hospital laboratories to submit electronic files of test results directly into the Missouri Health Surveillance Information System (MOHSIS) computer system. The data will then be processed and alert messages will be sent to local public health agency staff. This is expected to reduce the data entry workload and increase the completeness, accuracy and timeliness of laboratory reports.

D. Modern Surveillance Practice

Modern surveillance practice combines active and passive methods to get the most complete picture possible.

Example:

Influenza surveillance in Missouri includes the following information:

- Summary case counts collected by local public health agencies (LPHAs) from sentinel healthcare providers. This information is compared with reporting from previous time periods to track the seasonal epidemic.
- Weekly reports from healthcare providers (34 healthcare providers in 2005) who participate in CDC’s US Influenza Sentinel Provider Surveillance Network (US ISPSN). They report the number of patients they have seen that week, broken down by age group, and how many of them showed influenza-like illness. This information is compared to a national baseline.
- Results of laboratory tests performed by the State Public Health Laboratory, and of more specialized testing performed on some isolates by the CDC laboratory (passive surveillance). This information is used with other test results from around the world, to determine influenza vaccine strains for the coming year.

All of these sources of surveillance information are combined into a weekly report posted on the DHSS website.

Example:

For vector-borne diseases, some combination of active and passive surveillance of both humans and animals may be needed. Surveillance for arboviruses such as West Nile Virus (WNV) is a good example. In Missouri, arboviral surveillance includes humans, horses, birds and mosquitoes.

- **Dead birds** are collected and submitted to DHSS by (LPHAs) for laboratory testing. This may be the only early warning that local spread of the WNV virus is occurring.
- **Mosquito trapping** is the best tool to quantify the intensity of virus transmission in an area. In 2004 over a dozen LPHAs (covering 59% of the Missouri population) trapped mosquitoes, collected them, and either shipped them for testing or tested them locally and provided the results to DHSS.
- **Equine (horse) surveillance** is a passive system that relies on veterinarians to report. Equine WNV is rare now that a vaccine is in wide use.
- **Active surveillance for human cases.** During the peak of WNV activity in 2001–2003, sentinel healthcare providers were contacted by LPHAs at least two times per week.
- **Passive surveillance for human cases.** This is mostly laboratory-based, with the majority of reports coming from the State Public Health Laboratory.

2. DATA ANALYSIS →How do we make sense of it?

- Before surveillance data can be interpreted, they must be organized and analyzed.
- Computer systems such as MOHSIS are frequently used to compile the information and analyze it.
- We must always take care to clearly define the questions we are trying to answer through data analysis, to make sure the results are useful for public health action.
- In some circumstances, for example the very early stages of investigating a suspected outbreak, hand tallies of information about suspected cases may be useful.

A. Determine the number of cases.

- Every reportable disease has an official case definition that is used to determine whether a case should be “counted” in the surveillance system.
- The case definition is usually a combination of symptoms and laboratory test results, and is defined by CDC for nationally notifiable diseases.
- Case definitions reflect different levels of certainty. There are definitions for suspect vs. probable vs. confirmed cases.
- Each case reported to the system should be evaluated in relation to the case definition, as a basic quality assurance mechanism.

B. Calculate incidence rates.

- Rates take into account the size of the population so comparisons can be made across geographic areas.
- By using rates, the incidence in one county can be compared to state or national incidence of the disease.
- For more information about rates, see Module IV, Statistical Measures.

C. Analyze the data by person, place and time.

- Person includes variables such as age, sex, and race, as well as risk factors such as childcare or food handler status.
- Place may be a nation, state, county, city or even zip code or census tract.
- Time is usually represented as date of onset of illness, grouped by day, week, month or year.
- More detailed information about these epidemiologic variables will be given in Module V, Displaying and Interpreting Epidemiologic Variables.

D. Current surveillance data are compared with some expected value to identify how they differ and to assess their importance.

One way to do this is by comparing the incidence rate in the current time period with past incidence in the same jurisdiction. This may be incidence as of the same time last year, or a measure of the “usual” incidence, such as a five-year median (see Module IV, Statistical Measures).

E. It is also useful to compare with other jurisdictions.

Is the current incidence rate in County A significantly higher than that in surrounding counties, or the state or national average? If so, that may indicate a problem that needs to be followed up.

F. Spatial analysis may be helpful.

- Modern technology such as Geographic Information Systems (GIS) can create very informative analyses.
- The locations of cases can be viewed in relation to environmental features and/or population characteristics.

3. INTERPRETATION OF DATA→ What can we learn from all these numbers?

If the analysis shows that the incidence of a disease is different from what you would expect, then further investigation should be done.

- For some diseases, this is true even if the number of cases is small.
Example: even a single case of a potential bioterrorist agent (such as anthrax) or a vaccine-preventable disease (such as measles) should be investigated.
- There are several possible explanations for changes in surveillance data. Explanations that should be considered include (but are not limited to):
 - An outbreak
 - An intentional exposure (such as a bioterrorist attack)
 - A newly emerging infection
 - Improved diagnosis (new laboratory test, increased physician awareness)
 - Increased awareness of the disease and/or the need to report it
 - A gradual increase or decrease in incidence due to environmental or population changes, or changes in the disease agent
 - A disease following its natural seasonal or “secular” (years-long) cycle
 - Changes in the surveillance system (new data collection system, loss of a reporting source, addition of a new source, change in case definition, etc.)

4. DISSEMINATION OF THE INFORMATION→ Sharing the Results

- The purpose of sharing surveillance information is to inform those who need to know, and to motivate those who need to do something.

Examples:

- keeping healthcare providers informed about current trends can help them diagnose and treat their patients better.
- Keeping policymakers informed can assist them in allocating resources and updating rules, ordinances and laws.

- And keeping public health professionals and administrators up to date will help them design and carry out better programs.
- Surveillance data generally flow “up” through the public health system, from local reporters to local public health agencies, to DHSS, to CDC, to the World Health Organization (WHO).
- As with any good communication, the information must be tailored to the audience.
 - Public health workers may need more detailed information than other groups.
 - In general, reports should be brief and clear, and should highlight the information most important to the reader.
 - **Examples** of reports issued by Missouri may be found at <http://www.dhss.mo.gov/Influenza/Reports.html>
 - **Examples** of reports issued by CDC may be found at www.cdc.gov/mmwr.

5. LINKS TO PUBLIC HEALTH PRACTICE→Information for Action

- The only reason to carry out public health surveillance is to use the information to improve the health of the public.
- Many of the ways this is done were discussed earlier in the section, “Why Do We Do Public Health Surveillance?”

VI. EVALUATION AND IMPROVEMENT OF PUBLIC HEALTH SURVEILLANCE

- An efficient, effective public health surveillance system is essential to protect the public’s health.
 - Because disease agents, host factors, the environment and the healthcare system are constantly changing, we must continuously assess and improve our surveillance systems.
 - A periodic evaluation can provide information for improvement.
- Probably the most important question to ask in evaluating a surveillance system is: “How useful is it?” Some ways to look at usefulness are:
 - Does the public health surveillance system contribute to the prevention and control of diseases?

- Does it contribute to an improved understanding of the public health implications of diseases (numbers of people affected, severity of illness, burden of hospitalization, etc.)?
- Can it help determine that a disease that was previously thought to be unimportant is actually important?
- Does it provide data for performance measurement, including health indicators used for assessing community needs and evaluating health programs?
- It may be helpful to list and describe the actions taken as a result of analysis and interpretation of the data from the system, and to identify who has used the information to make decisions and take actions.

CDC has identified the attributes of a good surveillance system. They are:

- ◆ Simplicity. Is the system simple in structure and easy to operate? Are there steps in the process that could be combined or eliminated? Surveillance systems should be as simple as possible while still meeting their objectives. The simpler the system, the more acceptable and timely it is likely to be. Simpler systems also take fewer resources to operate.
- ◆ Flexibility. Can the system adapt to changing information needs or operating conditions with little additional time, personnel, or allocated funds? Does the system use standard data formats (e.g., in electronic data interchange) that can be easily integrated with other systems?
- ◆ Data quality. Is the information in the system complete and valid? One easy way to check this is to examine the percentage of "unknown" or "blank" responses to items on surveillance forms. However, a full assessment might require a special study in some cases.
- ◆ Acceptability. Are people and organizations willing to participate in the surveillance system?
- ◆ Sensitivity. What proportion of actual cases are detected by the surveillance system? This may require a check against other data sources, such as hospital discharge data or a laboratory record review. Can the system monitor changes in the numbers over time, and detect outbreaks?
- ◆ Predictive value positive. What proportion of reported cases actually have the disease under surveillance? This can be assessed by looking at how many of the reported cases meet the case definition, or how many are eventually classified as confirmed.

- ♦ Representativeness. Does the system accurately describe the occurrence of the disease over time and its distribution in the population by place and person? Or is it “skewed” toward certain age groups, ethnic groups, geographic areas, or healthcare providers?
- ♦ Timeliness. How quickly does the system receive and process information? This can be assessed by looking at the speed between steps in the system.
- ♦ Stability. How reliable is the system (reliability is the ability to collect, manage, and provide data properly without failure). Is the system operational when it is needed?

By evaluating these attributes, we can identify ways to improve the system. For more complete information about these criteria and recommended methods for evaluation of surveillance systems, go to

www.cdc.gov/mmwr/preview/mmwrhtml/rr5013a1.htm.

Limitations Of Disease Reporting Systems

- It is important to remember that no formal system can take the place of good relationships and communication networks in a community.
- There is no substitute for good collegial relationships among the public health agency, healthcare providers, and other key informants such as the school system.
- Time spent building those relationships can help assure that the public health agency is kept “in the loop” when problems occur.